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### Part I. Sources of the Construction Equipment after World War II.

The problem of mechanization has become, since the first years after WWII, a foremost propaganda problem in the Polish construction industry. The government took advantage of <sup>the</sup> incontestable fact that prewar Poland was a country with a very low level of mechanization in construction work. Before WWII, Poland had a high percent of unemployment; labor was cheap; capital very difficult to get; there was almost no industry producing construction machinery and equipment; the construction projects were not very complicated; the construction industry was mainly engaged in general construction; few factories were built, therefore the construction work could be implemented without the use of heavy machinery and equipment. As a result of all these circumstances, the prewar construction industry was not mechanized.

For example, in prewar Poland, bricks were carried to the floors on the building site by so-called brick-porters(kozlarz) on their backs, the concrete was very often <sup>u</sup>mixed manually by shovels. Although it may seem strange it was cheaper in prewar Poland to mix concrete manually by employing a brigade of seven workers than to use a machine mixer because the equipment, electric current, and fuel were relatively expensive. Only in Warsaw, in the so-called Central Industrial District (COP) and in Gdynia (it <sup>u</sup>was) cheaper to use a mixer than manual labor. Only in 1936, did concrete mix<sup>e</sup>rs begin to be used generally on housing construction sites but, e.g., lime and mort<sup>3</sup>ar

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for plastering were almost always prepared manually and the so-called "raking man" (gracownik) was an inevitable figure on the building site. A thorough study of this subject has never been made, but some analyses prepared [ ] during the years 1950-1957, permitted him to estimate that in prewar Poland there was a ratio of one mechanical horse-power to 40 workers, an extremely low, probably one of the lowest, indexes of mechanization in Europe before WWII.

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When evaluating the present official statistics published by the government about the development of mechanization in Poland, it should be remembered that this is the extremely low, 1939, initial basis with which the current indexes of mechanization are compared.

A comparison of the prewar period of construction work in Poland with the postwar period is difficult because of lack of studies on this subject, distorted data quoted by the present official statistics, changed relations of prices and changed frontiers of the country. Nevertheless it is known that the investment activity before the WWII was relatively low and already in 1946, investments in Poland were higher than the average yearly investments in prewar Poland within the old boundaries. If one would compare the prewar investments on the present Polish territory, then probably the Polish and German investments in these territories were higher before the WWII than the investments in 1946.

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[redacted] below the following analysis of prewar investments in Poland. From 1918 to 1929 investment was growing and reached its first peak in 1929. If we take the level of investments in 1929 for 100 then there was a decline of investments from 1930-1936 in Poland. During the years 1932-1933 the level of investments in Poland dropped to 60. There was a gradual improvement from 1934 and in 1935-1936 investments returned to the level of 100. Later came a period of revival and in 1937 and in 1938 the investments reached the level of 126. It is difficult to get any statistics for the war years 1939-1945. In 1946 the level of investments was above 126, i.e., higher than in 1938 and kept on rising.

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The investment outlays amounted in Poland during the years 1946-1949 in 1956 prices in billion zlotys:

1946	10.7
1947	13.6
1948	16.9
1949	20.9

It can be assumed with sufficient approximation that the investments in 1949 were 2.5 times higher than in 1938.

Also according to [redacted] analyses made during the years 1950-1957, the number of mechanical horse-power for one worker in 1949 was double that in 1938. In 1949 there was one HP for 20 workers.

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As is seen from the above, the equipment potential used in Poland in 1949 was *five* times higher than in 1938 within the old prewar Polish territory. The question arises as to the source of this added construction equipment in 1945-49?

This increase of equipment was the result of the remainder on the Polish territory, especially in the Western Territories, of substantial amounts of machinery and equipment left there by Germans. The standard of mechanization in the Western Territories which embrace *five* voivodships (of a total 17 at present in Poland) was already several times higher than in prewar Poland. Besides that the Germans were building many industrial projects on the territory of present Poland during the years 1939-1945, and were bringing machinery from all over Europe and for this reason there was enough equipment in Poland in 1945.

The German military labor organization, "Todt", built highways, airfields, bunkers, fortifications, etc., on a large scale and when they retreated, a lot of engineering equipment was left. So the first source of increase of construction machinery in Poland was the so-called after-German-equipment (sprzet poniemiecki). Many of these machines were brought to Warsaw and the mechanization of construction in the entire country was based on this equipment from the Western Territories.

These machines were mainly concrete mixers, excavators, cranes and hoisting machines, road construction machines and equipment. There was a great amount of this equipment, but due to insufficient control,

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maintenance and protection, a great number of fine and valuable parts were stolen during the period 1945-1949. Therefore the usefulness of this equipment was much less than one could expect from its quantity. The lack of understanding of these problems by the government during the above mentioned years, and failure to prevent this theft caused an enormous waste of this equipment left in Poland by Germans. What was saved was due rather to the initiative and energy of several civil engineers in Poland who, on their own responsibility and with great difficulties, protected this equipment, very often against the orders of the Soviet Army authorities which transported all valuable machinery and equipment to the USSR. Fortunately they did not regard this equipment as being very valuable and were more interested in dismantling factories than in construction equipment.

At any rate there was, already in 1949-1950, so much hoisting equipment on the construction sites in Poland that the brick porters almost disappeared. The government proclaimed this as the first great victory of the socialistic economy that the hard physical work of brick porter was liquidated. However, the stock of this equipment left by Germans was exhausted very quickly, mainly because of shortage of spare parts. In order to repair one machine another was dismantled and this kind of plundering caused a sharp equipment crisis in 1950-52 which was *worsened* by the large investments of the Six Year Economic Plan, 1950-1955.

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At the beginning of the Six Year Plan the government neglected the real problem, namely it did not create its own construction equipment industry. The government was preoccupied with other tasks, with armament projects, and left the construction industry, which was given great tasks, without an established basis of construction equipment. The government was impressed by figures on paper that Poland had a great number of construction machines left by the Germans, that Poland would receive new machinery from USSR, from remuneration for war losses, and did not think of domestic production. During the years 1950-1952, the situation became so critical that the government decided to import construction equipment wherever it was possible. Agreements were concluded with Western companies but, before the orders were realized various difficulties arose, among them political, Korean war, shortage of foreign currency, embargo on some machinery like bulldozers, and in fact very little equipment was obtained from the West in these contracts. Commissioner for the purchase of equipment, Jablonowski, was arrested; some contracts made by him with the West were cancelled by the government. The USSR delivered some machinery, mainly excavators, but not a sufficient number and did not want to sell the more needed self-propelled cranes, bulldozers and additional spare parts (the West delivers additional sets of spare parts).

In spite of these difficulties, the amount of construction equipment increased, but insufficiently, and the equipment crisis caused by the lack of domestic production, shortage of spare parts and repair

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establishments continued during the Six Year Plan. The zloty value of the construction equipment increased seven times during the years 1950-1955. Simultaneously, however, the tasks of the construction industry grew. The value of production is shown in Table 1 below. According to the article "Investments and the Construction Industry during 15 Years", published in "Fundamenty" 26 July 1959 on page 5:

Date	Value of construction assembly production in 1958 prices in billion zlotys	Index of the increase of production 1950=100	Total employment in thousands	Index of the increase of employment 1950=100
1950	14.8	100	458	100
1951	23.8	160	616	135
1952	30.0	202	660	144
1953	35.9	242	709	155
1954	36.5	246	668	146
1955	37.4	252	647	141
1956	37.3	252	659	144
1957	37.0	251	647	141
1958	40.4	273	644	141
1959	45.8	309	699	153

This table shows that the value of the construction-assembly production amounted

in 1950 in 1958 prices to 14.8 billion zlotys and

in 1955 in 1958 prices to 37.4 billion zlotys i.e., increased 2.6 times.

The number of employees in the construction industry increased 1.4 times.

The above figures indicate also that the amount of equipment expressed in mechanical horse-power for one employee increased about  $1.\overset{7}{4}$  or five times.

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It can be accepted that in 1955 there was one mechanical horse-power for four persons in the construction industry. (This includes manual and white collar employees.) If we take into account only manual workers, there were three to three and half workers for one mechanical horse-power.

This is at any rate about 11 times more than before WWII and the government did not fail to emphasize this fact in its propaganda. However, in comparison with the level of mechanization in the West this is still a very low figure. But not only the quantitatively insufficient level of mechanization is decisive but the situation is worsened by the very bad administration of this equipment. The variety of types imported from various countries, USSR, Czechoslovakia, Eastern Germany,  army surplus, and prewar German equipment, made any reasonable economy of spare parts difficult. The shortage of high quality steel did not permit the domestic production of spare parts, while enormous costs of such individual production and the necessity to produce blueprints for every part would have made it even more complicated. A disadvantage of this equipment consisted also in the fact that they were mostly heavy, obsolete types useful only for some specific kind of work. There was a shortage of transport for this heavy equipment because no heavy tractors were bought in the West.

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There was also a shortage of engineers experienced in using this equipment, a shortage of mechanical engineers who knew these machines and a shortage of well trained machine operators. But it was the non-existence of domestic production of construction equipment which was a major cause of the low standard and effectiveness of mechanization in Poland.

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During the Six Year Plan, 1950-1955, the construction industry helped itself by employing a great number of workers and recruiting peasants from villages, which was among the causes of the decline of agriculture in Poland.

At any rate, during the years 1950-1955 the mixing of concrete was entirely mechanized and the manual mixing of mortar largely disappeared from the building sites in Poland. This was proclaimed as the next success of the Communist direction of the construction industry in Poland.

As late as 1955, the government made the most important decision which may improve the dilemma of mechanization in Poland, namely to start own production of the construction equipment. This decision was 10 years too late and its delay caused great losses to the national economy of the country. This decision was influenced by the following factors:

a/ The increase of housing construction and investments in general, and by the shortage of labor after the change in agricultural policy. The government saw that further recruitment of peasants from villages would be detrimental to agriculture. Basically employment in the construction industry as shown below has not increased since 1953, although construction tasks increased from year to year.

Total Employment in the Construction Industry

1953	709,000
1954	668,000
1955	647,000
1956	659,000
1957	647,000
1958	644,000
1959	699,000

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Therefore, an increasing volume of work must be achieved not by an increase in employment (at least not in the same proportion) but by an increase of productivity and mechanization.

b/ The reduction of the armament industry after 1955. The factories engaged in armament production started in 1956 to look for other types of production. Because construction equipment is not difficult to manufacture, the factories willingly changed in this direction.

c/ A general trend towards the development of the machine industry in order to increase exports and earn hard foreign currency. Poland even tries to find markets for construction equipment.

d/ Some improvement, although as yet insufficient, in the production of high grade steel in connection with the expansion of Nowa Huta Steel Works Stalowa Wola, Baildon Steel Works and Ball Bearing Factory in Krasnik. The completion in 1960-61 of the high-grade Steel Plant in Warsaw will finally solve the problem of high-grade steel. This will allow the production of parts for construction machines which wear out very quickly in use.

e/ A generally better understanding of the problems of building materials and the problems of the construction equipment in the decisive circles of the government.

f/ The government policy of change to the so-called industrialized mass construction methods consisting of prefabrication of parts and units in factories and their assembly on the building sites with the help of machinery.

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g/ The increased contacts with the West after 1956 which taught Poles how backward Poland was in mechanization; at the same time the contacts indicated the direction which should be followed in the production of construction equipment.

Of course there is a long way from the decision of 1955 and from the creation of the Central Administration of the Construction Machine Industry in 1956 to serial production of construction equipment. But already in 1959 one can speak about the existence of the gradually expanding construction machinery industry in Poland.

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